Comparison of smartphone addiction and food addiction in patients admitted for weight loss

Eurasian Clinical and Analytical Medicine Original Research

Comparison of food addiction and smartphone addiction

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Abstract

Aim: This study aims to compare smartphone addiction and food addiction in patients admitted for weight loss.
Materials and Methods: The study was conducted with the participation of 113 volunteers who were admitted to the obesity outpatient clinic of our hospital between January 2017 and January 2018. The participants of the study were given a sociodemographic characteristics form, the Yale food addiction questionnaire, and the smartphone addiction scale. The physical examination and anthropometric measurements (age, gender, height, weight, waist circumference, hip circumference, blood pressure) of all patients were performed by the researcher. SPSS 22 package program was used for the statistical analysis of the data. A p-value of <0.05 was considered significant.
Results: The median age of the participants, 95 of whom were female and 18 were male, was 34,5 (45,0-31,0) years. Among the participants, 17.7% had smartphone addiction and 33.6% had food addiction. The rate of food addiction was 50.0% in the group with smartphone addiction, while it was 30.1% in the group without smartphone addiction (p> 0.05), and there was a positive correlation between the smartphone addiction score and the food addiction score (r; 0.207 p = 0.033). While the mean age of the group with smartphone addiction was lower (28.5 years vs. 34.0 years) (p = 0.013), the height, weight, BMI, waist circumference, hip circumference, systolic and diastolic blood pressure parameters were similar to those without smartphone addiction (p> 0.05) (Table 2). The age, height, weight, BMI, waist circumference, hip circumference, systolic and diastolic blood pressure parameters of the groups with and without food addiction were similar (p> 0.05).
Discussion: Overweight and obese people with smartphone addiction exhibited negative eating behaviors. Effective nutrition education programs and a national support policy are required to correct the unhealthy eating behaviors of obese people caused by smartphone use.

Keywords

Smartphone addiction; Food addiction; Obesity

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Introduction

Obesity is a chronic disease characterized by increased body fat mass in proportion to the fat-free body mass [1]. Social, cultural, emotional and diet-related factors as well as genetic predisposition play a role in the development of obesity. Neurobiological research reveals that there are similarities in reward systems involved in obesity and substance addiction. Therefore, the probability that food addiction may also have a role in obesity has become the main topic of conversation. While some researchers recommend including obesity in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as a mental disorder other than a food addiction, [2] others suggest that obesity should be defined as a hereditary neurobehavioral disorder [3]. It has been stated that the behaviors arising in food addiction are not sufficient to explain the entire obesity, but that it is an important finding that many neurobiological changes arising in food addiction are also detected in obese people [4].

Eating habits, lifestyle, physical inactivity, stress and irregular sleep are some of the important risk factors for the development of obesity. In addition to personality traits, occupation, educational background, and spiritual characteristics, the use of the internet and smartphones, which are increasingly used nowadays, can also be a factor for physical inactivity. In the last decade, smartphones have become an indispensable instrument of daily life. As per the data published in April 2020, the rate of smartphone use in the world increased to 79% in women and 74% in men. The rate of smartphone use in Turkey was determined to be 77%. Smartphones provide many satisfactory elements, such as constant internet access, access to social networks, games, entertainment, finding information, effective use of time, in addition to its fundamental functions of being a communication device [5,6]. Since individuals almost always keep their smartphones with them and can use their smartphones many times during the day, the use of smartphones can become an automated behavior requiring little thought [7]. It is stated that the use of high-frequency smartphones can become a behavioral addiction in individuals. Individuals with signs of smartphone addiction tend to bring their phones with them wherever they are and to think about their phones even if they cannot use them, which affects their daily activities. The criteria recommended to determine whether an individual suffers from smartphone addiction include a compulsive use of phones, tolerance resulting from a longer and more intensive use, withdrawal symptoms and disruption in daily life activities [8]. However, smartphone addiction is not identified as a disorder in the DSM-5 [9]. Overuse of smartphone, although it is not yet officially defined as a disorder, has been associated with sleeping disorders, [10] in addition to physical and mental problems, such as visual impairment, musculoskeletal problems, depression, and anxiety [11,12] Nevertheless, no study investigating the association of smartphone addiction with other health problems, such as problematic eating behaviors, food addiction, and fattening, were found except for two studies conducted on adolescents and elementary school students [13,14]. Many studies that take into account smartphone use and health risks analyze the total time spent on smartphones rather than the smartphone addiction itself. Considering the high rates of smartphone use and the concerns about phone addiction, it is important to clarify whether smartphone addiction can contribute to problematic eating behaviors and fattening.

In order to address the limitations of previous studies and to form a basis for prospective clinical studies, our study aims to investigate: (1) the differences in smartphone addiction and food addiction by age, gender, profession, educational level, income level, exercise level; (2) the relationship between food addiction and obesity in individuals with smartphone addiction; (3) the characteristics of smartphone use of individuals with food addiction; (4) whether the combination of smartphone addiction and food addiction triggers each other.

Material and Methods

Approval was obtained from the local ethics committee before starting the study. Among 1247 patients, who were admitted to the Family Medicine Polyclinic between January 2017 and January 2018 for weight loss, 350 who met our criteria were informed about the study in accordance with the Helsinki Declaration, and 160 patients voluntarily wanted to participate in the study. The participants of the study were provided with a sociodemographic characteristics form, the Yale Eating Addiction questionnaire, and the smartphone addiction scale. They were ensured to fill in the forms on their own. They were assisted by the researcher in cases where they did not understand. Forty-seven patients were excluded from the study because they incompletely filled in the questionnaires. The study was completed with 113 patients. Those who were illiterate, pregnant and breastfeeding, those under the age of 18 years and over the age of 65 years, those with malignancy, endocrine disorder, diagnosed psychiatric disorder, those who do not use a smartphone, and those who do not want to fill in the questionnaire were excluded from the study.

Sociodemographic characteristics form:

Gender, marital status, profession, monthly income, educational background, exercise habits, any previous dieting experiences, smoking, alcohol consumption, and chronic diseases were questioned using this form prepared by the researcher.

Anthropometric measurements:

The physical examination and anthropometric measurements of all patients (age, gender, height, weight, waist circumference, hip circumference, blood pressure) were performed by the researcher and recorded on the patient cards. Height (m) and weight (kg) were measured with the upper clothes taken off. Waist circumference was measured at the umbilical level between the iliac crest and lateral costa (cm). Hip circumference was measured at the level of the trochanter major (cm). Body mass index (BMI) was calculated using the weight (kg)/height (m)2 formula. Those with a BMI of 25-29.9 kg/m2 were classified as overweight, those with a BMI of 30-34.9 kg/m2 as grade 1 obese, those with a BMI of 35-39.9 kg/m2 as grade 2 obese, and those with a BMI of 40.0 kg/m2 and above as grade 3 obese [15].

Yale Food Addiction Scale:

In order to make the diagnosis and measurement of food addiction in a unified and feasible order, the researchers at the Yale University created a scale that evaluates the habits of consuming foods containing high sugar and high-fat content and that is adapted by transforming the substance addiction criteria in the DSM-IV-TR. [16]. The Yale Food Addiction Scale measures 2 different values. The scale contains 27 questions used to detect addictive-like eating behaviors in the last year. Three questions measure excessive and long-term consumption of food; four items measure the willingness to quit and failed attempts; three questions measure the level of time and activity spent on access to and use of the substance; four questions measure the decreasing or abandoned social life, work-life and leisure activities; one question measure the continuous use despite knowing of adverse effects and results; two questions measure tolerance; three questions measure the withdrawal symptoms and the continuous use for the purpose of diminishing the withdrawal symptoms, and two questions measure disorders from a clinical aspect. The number of symptoms ranges from 0 to 7. In order to diagnose food addiction, the score for clinical sensitivity should be equal to 1 and the number of symptoms should be at least 3 in a similar manner to substance addiction. The Cronbach's alpha value of the scale was found to be 0.93 in the reliability analysis made for the Food Addiction Scale [17]. In studies conducted with this scale, it has

been found to have good internal consistency and high cross-validity with scales evaluating other eating disorders. It is stated that this questionnaire can evaluate the addictive potential of those with eating disorders, as well as functioning as an appropriate assessment tool in other eating-related disorders [16]. Its Turkish validity and reliability study was performed by Bayraktar et al [17].

Smartphone Addiction Scale:

Kwon et al. initially prepared a 33-question scale to assess smartphone addiction. Subsequently, due to the fact that this scale was long and did not yield consistent results and failed to reveal the cut-off scores, they developed a shorter form of the same scale, which can be filled in in a shorter time and more easily by selecting 10 questions out of the 33 questions and has a diagnostic value with cut-off points [18]. Noyan et al. showed its validity and reliability by adapting the Smartphone Addiction Scale Short Form to Turkish [19]. The scale consisting of 10 items was evaluated with a six-point Likert scale. The scale is evaluated with a minimum of 10 and a maximum of 60 points. As the score increases, the risk of addiction increases. The cut-off score was considered as 33 for females and 31 for males [18]. Cronbach's alpha internal consistency coefficient and concurrent validity of the original form are 0.91. The Cronbach's alpha coefficient of the scale was found to be 0.86 in Turkey [19].

Statistical method:

Statistical analysis of the data obtained in the study was carried out with the SPSS 22 software package at a significance level of $\alpha = 0.05$. Categorical variables were presented as frequency and percentage, and numerical variables as mean, standard error, median, interquartile values. Descriptive statistics were used in single groups, while the chi-square test was used to compare categorical data. The Kolmogorov-Smirnov and Shapiro-Wilk analyses, the normality distribution tests for continuous data, were used. Since all data were non-parametric, the Mann Whitney-U test, one of the non-parametric tests, was used for the comparison of two groups, while the Spearman correlation analyses were used to measure the correlation levels.

Results

The study was completed with 113 patients who were admitted for weight loss. The median age of the participants (95 females and 18 males) was 34,5 (45,0-31,0) years. The majority of the participants (70.8%) were unemployed, 36.7% had an income level of the minimum wage (1300 TL) and below, 41.3% had an income between 1300-3000 TL. Among the participants, 42% were elementary school graduates, 25% were high school graduates, and 27.5% were university graduates, and 52.5% had attempted to follow a diet at least once before. Among the applicants, 73.5% stated that they rarely or have never exercised, 18.6% were smokers, and 40.7% had a history of chronic disease. Diabetes, hypertension, chronic ischemic heart disease, asthma, chronic obstructive pulmonary disease were the most common chronic diseases. Among the participants, 17.7% had smartphone addiction and 33.6% had food addiction (Table 1).

While the mean age of the group with smartphone addiction was lower (28.5 years vs. 34.0 years) (p = 0.013), the height, weight, BMI, waist circumference, hip circumference, systolic and diastolic blood pressure parameters were similar to those without smartphone addiction (p> 0.05) (Table 2). The age, height, weight, BMI, waist circumference, hip circumference, systolic, and diastolic blood pressure parameters of the groups with and without food addiction were similar (p> 0.05).

While the rate of food addiction was 50.0% in the group with smartphone addiction, the rate of food addiction was 30.1% in the group without smartphone addiction. The difference was not significant (p> 0.05), yet there was a positive correlation between the smartphone addiction score and the food addiction score (r; 0.207, p = 0.033). The rate of smartphone addiction was 17.9% in females and 12.5% in men (p> 0.05), 15% in married individuals, 25% in singles (p> 0.05), 20.3% in unemployees, and 11.3% in employees (p> 0.05). While the rate of addiction is 15.4% in those with elementary and lower education levels, the rate of smartphone addiction was 20% in those with education levels of high school and above (p> 0.05). The rate of smartphone addiction was 20% in those who earned a minimum wage and below and 16.2% in those earning

Table 1. Sociodemographic and lifestyle features

	n	%
Gender		
Female	95	85,6
Male	18	14,4
Marital status		
Married	80	71,4
Single	33	28,6
Profession		
Not working	80	70,8
Worker	12	10,6
Officer	19	16,8
Tradesman	2	1,8
Monthly income		
1300 TL (minimum wage)	40	36,7
1300-3000 TL	45	41,3
3000-5000 TL	20	18,3
50000 TL and above	4	3,7
Education status		
Primary education	52	47,5
High school	28	25,0
University	33	27,5
Have you been on a diet before?		
No	53	47,3
Yes	60	52,7
Exercise		
Never do	40	35,4
Rarely	43	38,1
One time per week	4	3,5
One-three times a week	13	11,5
More than 3 times a week	13	11,5
Smoking		
No	92	81,4
Yes	21	18,6
Alcohol		
No	111	98,2
Yes	2	1,8
Disease history		
No	67	59,3
Yes	46	40,7
Smartphone addiction		
No	93	82,3
Yes	20	17,7
Food addiction		
No	75	66,4
Yes	38	33,6

TL: Turkish lira

Table 2. Comparison of the Groups with and without Smartphone Addiction

	Have smartphone addiction (n=20) Median (%75-%25)	No smartphone addiction (n=93) Median (%75-%25)	p
Age (year)	28,50 (37,50-18,50)	34,00 (45,00-27,0)	0,013
Height (cm)	158,50 (165,00-154,50)	160,00 (167,50-156,00)	0,334
Weight (kg)	82,00 (88,50-71,00)	84,00 (93,00-74,5)	0,348
BKI (kg / m2)	32,69 (35,52-28,47)	32,29 (36,54-29,23)	0,078
Waist circumference (cm)	98,00 (103,00-93,00)	101,00 (108,00-94,00)	0,071
Hip circumference (cm)	110,00 (117,00-106,00)	115,00 (120,00-109,00)	0,776
Systolic blood pressure (mmHg)	110,00 (120,00-100,00)	110,00 (125,00-100,00)	0,250
Diastolic blood pressure (mmHg)	70,00 (80,00-60,00)	80,00 (80,00-70,00)	0,372
Food addiction rate (%)	50,0	30,1	0,076

more than minimum wage (p> 0.05). While a lower level of addiction was detected in those who exercised at least once a week compared to those who did not exercise at all or rarely exercise, a higher rate of smartphone addiction was found in non-smokers, although it was not significant (p> 0.05). While the rate of smartphone addiction was 23.3% in those who previously followed a diet, it was 11.3% in those who have never followed a diet (p> 0.05).

While the rate of food addiction was 32.6% in females, this rate was found to be 43.8% in males (p> 0.05). The rate of food addiction was 35% in those who were married, 28.1% (p>0.05) in singles, 40% in those with a low-income level, and 30% in those with a high-income level (p>0.05). While it was 41.2% in smokers, it was 32.3% in non-smokers (p> 0.05). While the rate of food addiction was 39.1% in those with a chronic disease, it was 29.9% in those without comorbidity (p> 0.05). Of the overweight individuals, 27.8% had food addiction, while this rate was 36.4 in obese individuals (p> 0.05).

The responses given by the group with food addiction for smartphone addiction were addressed one by one. In those with food addiction, the rate of disrupting the planned works was found to be higher due to the use of smartphones compared to those without food addiction (p = 0.041). Those with food addiction were found to be more likely to say, "I cannot tolerate the absence of my smartphone" (p = 0.035) (Table 3). The total score of smartphone addiction was found to be similar in the groups with and without food addiction (p> 0.05), but the food addiction score was found to increase with increasing smartphone addiction score (r; 0.207 p = 0.033). There was a negative correlation between smartphone addiction and age (r; -0,361 p <0.001), smartphone addiction decreased as age increased. However, no correlation was found between smartphone addiction and weight, BMI, waist circumference, hip circumference, systolic, and diastolic blood pressure. There was a strong positive correlation between weight and waist circumference, hip circumference, BMI, systolic, and diastolic blood pressure.

Discussion

The primary aim of this study is to evaluate the smartphone addiction, which is one of the types of screen addiction thought to be effective in the emergence of obesity and to understand whether it correlates with body composition (weight, BMI, waist circumference, hip circumference) and eating behavior. The rate of food addiction was found to

Table 3. Comparison of the Smart Phone Addiction According to the Food Addiction

	No food addiction (n=75)	Have food addiction (n=38)	p
1. I miss planned work due to smartphone use			
Strongly disagree	32 (%42,7)	20 (%55,6)	0,041
Disagree	19 (%25,3)	2 (%5,6)	
Weekly disagree	9 (%12,0)	2 (%5,6)	
Weekly agree	10 (%13,3)	5 (%13,9)	
Agree	2 (%2,7)	3 (%8,3)	
Strongly agree	3 (%4,0)	4 (%11,1)	
2. I have a hard time concentrating in class while doing assignments, or while working due to smartphone use			
Strongly disagree	33 (%44,0)	17 (%47,2)	0,264
Disagree	21 (%28,0)	8 (%22,2)	
Weekly disagree	9 (%12,0)	1 (%2,8)	
Weekly agree	6 (%8,0)	3 (%8,3)	
Agree	4 (%5,3)	3 (%8,3)	
Strongly agree	2 (%2,7)	4 (%11,1)	
3. I feel pain in the wrists or at the back of the neck while using a smartphone			
Strongly disagree	35 (%46,7)	19 (%52,8)	0,652
Disagree	21(%28,0)	5 (%13,9)	
Weekly disagree	7 (%9,3)	4 (%11,1)	
Weekly agree	6 (%8,0)	4 (%11,1)	
Agree	2 (%2,7)	2 (%5,6)	
Strongly agree	4 (%5,3)	2 (%5,6)	
4. I won't be able to stand not having a smartphone			
Strongly disagree	36 (%48,0)	17 (%47,2)	0,035
Disagree	18 (%24,0)	3 (%8,3)	
Weekly disagree	2 (%2,7)	6 (%6,7)	
Weekly agree	4 (%5,3)	2 (%5,6)	
Agree	12 (%16,0)	4 (%11,1)	
Strongly agree	3 (%4,0)	4 (%11,1)	
5. I feel impatient and fretful when I am not holding my smartphone			
Strongly disagree	41 (%54,7)	18 (%50,0)	0,310
Disagree	19 (%25,3)	9 (%25,0)	
Weekly disagree	6 (%8,0)	2 (%5,6)	
Weekly agree	2 (%2,7)	4 (%11,1)	
Agree	7 (%9,3)	2 (%5,6)	
Strongly agree	0 (%0,0)	1 (%2,8)	
6. I have my smartphone in my mind even when I am not using it			
Strongly disagree	38 (%50,7)	14 (%38,9)	0,194
Disagree	21 (%28,0)	7 (%19,4)	
Weekly disagree	5 (%6,7)	5 (%13,9)	
Weekly agree	3 (%4,0)	2 (%5,6)	
Agree	6 (%8,0)	3 (%,3)	
Strongly agree	2 (%2,7)	5 (%13,9)	
7. I won't give up using my smartphone even when my daily life is already greatly affected by it.			
Strongly disagree	31 (%41,3)	16 (%44,4)	0,454
Disagree	23 (%30,7)	5 (%13,9)	
Weekly disagree	6 (%8,0)	5 (%13,9)	
Weekly agree	5 (%6,7)	4 (%11,1)	
Agree	6 (%8,0)	4 (%11,1)	
Strongly agree	4 (%5,3)	2 (%5,6)	

be higher in the group with smartphone addiction. As the degree of smartphone addiction increased, the food addiction scores increased. However, we found that weight, BMI, waist and hip circumferences did not increase in those with smartphone addiction. The group with smartphone addiction was of a younger age. It was found to be higher in women, singles, unemployees, those with a low-income level, those with a high educational level, those who did not exercise, although the difference was not significant. We believe that this is caused by the limited number of patients. Food addiction was found to be higher in males, married individuals, employees, those with low education and income levels, smokers, those with a chronic disease, and obese individuals. However, the difference was not significant.

In studies conducted in the literature, the rate of smartphone addiction has been found to be higher in women [13,20]. The reason for this may be the fact that women attach more importance to peer relationships and use social media and messaging more. In our study, the rate of smartphone addiction was higher in females, but it did not reach a significant level; we believe that the reason for this is the limited number of patients and 70% of the participants were housewives, had advanced age, and use smartphones less frequently. The mean age of the group with smartphone addiction was lower than that of the non-addicted group. The results we obtained are expected, as the rates of following innovations, internet, social media, smartphone use, and playing games are higher among young people than middle-aged and elderly people. Studies in the literature have been mostly conducted on adolescents and university students [12-14, 20-23]. Our study was conducted on adults aged 18-65 years who were admitted for weight loss.

In our study, the weight, BMI, waist circumference, hip circumference, systolic, and diastolic blood pressure parameters of those with smartphone addiction were found to be similar to those without smartphone addiction. There are few studies on this subject in the literature. In a study conducted on university students, it was found that the rate of smartphone addiction was higher in overweight and obese individuals, that the rate of smartphone addiction increased the risk of obesity two-fold, and that obese people used smartphones more commonly [24]. In a study conducted on adolescents, it was found that smartphone addiction was correlated with body fat percentage, although no correlation could be found between it and BMI [13]. In our study, smartphone addiction was not found to be correlated with BMI, waist circumference, hip circumference, and blood pressure. This may be caused by the low mean age of our patients with smartphone addiction or by the fact that obesity is less prevalent in young people in our country compared to the middle-aged and elderly individuals. Furthermore, we examined weight, BMI, waist circumference, hip circumference but did not measure the fat ratio. Since these parameters cannot distinguish between muscle and adipose tissue, they do not fully reflect the ratio of adipose tissue in the body. In order to understand the fattening in the body, the methods of measuring body fat ratio might yield more accurate results.

Eating disorder was found to be correlated with smartphone addiction. In the literature, the term "multiple addictions" is recommended. It is stated that addictions trigger each other and that a susceptible personality increases the risk of addiction [13,25]. Similarly, in a study conducted on adolescents, smartphone addiction, and food addiction were found to be correlated [13,14]. In quite a similar way to support this study, food addiction increased as smartphone addiction increased in our study. This is caused by the fact that a person using a smartphone as a means of relaxation and to avoid mental distress will also tend to eat more. Similarly, eating can also be increased by distancing oneself from social communication and loneliness associated with smartphone addiction.

Our study has several limitations. Our study is a cross-sectional study, which was conducted only on overweight and obese individuals who were admitted for weight loss. It does not reflect the general population. The smartphone addiction and food addiction scales used are self-report scales and can be manipulated. No clinical interviews were made with the patients in the study; it is not possible to make a definitive diagnosis with the scale. Equalizing the ages of those with and without smartphone addiction would be more accurate in terms of comparing weight, BMI, waist circumference and hip circumference. However, we could not do this due to our limited number of patients.

Conclusion

In conclusion, overweight and obese individuals with smartphone addiction exhibited negative eating behaviors. Effective nutrition education programs and a national support policy are required to correct the unhealthy eating behaviors of obese people caused by smartphone use.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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